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# Mathematics 6

## Module 3

**Home Instructor's Guide  
and Assignment Booklet**

**3A**



**Learning  
Technologies  
Branch**

**Alberta**  
LEARNING

Mathematics 6  
Module 3: Patterns  
Home Instructor's Guide and Assignment Booklet 3A  
Learning Technologies Branch  
ISBN 0-7741-2206-4

**The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Home Instructor's Guide and Assignment Booklet.**

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

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## Module 3: Patterns

### Overview

Module 3 reinforces the student's understanding and analysis of patterns. The student will extend his or her understanding of factors and multiples to include common factors, common multiples, the greatest common factor, and the least common multiple. The student explores methods for finding prime numbers and the prime factorization of composite numbers. The student describes relationships seen in picture patterns and number patterns and formulates rules to extend patterns. The student will build tables and see how patterns can be represented with graphs.

Algebraic expressions and equations are introduced. The student will form verbal rules and algebraic expressions to describe how the quantities of different objects used to make a pattern are related to each other. The student sees how graphs can be used to represent these relationships and how problems can be solved by finding the value of expressions or by reading the graphs. The student models problems with equations and then solves the equations using blocks, pictures, counting, and opposite operations.

### Assessment

At the end of each of the three lessons in Module 3, the student will be directed to complete an assignment in one of the two Assignment Booklets. The assignments will be graded by the teacher and have a total value of 90 marks.

The student is also expected to complete the Numbers in the News project. This project has a value of 10 marks. Encourage the student to look through a newspaper at least once a week for items on the Scavenger Hunt list. Read through the list with your student and suggest that he or she begin collecting samples of the ideas that he or she already understands. Other samples can be collected as ideas are introduced or extended in the module. Encourage your student to collect as many samples as he or she wishes. At the end of the module, the student will need to choose at least one sample for each question and submit the samples with the Assignment Booklet.

### Pacing

The module has been designed so that the student can work at his or her own pace. Each lesson, including the lesson assignment, will take the average student about one week to complete. The Challenge Activity in each lesson is optional.

Allowing extra time for review of basic facts and project work, Module 3 will take the student 4 to 5 weeks to complete.

## Lesson 1: Whole Number Patterns

### Overview

This lesson extends the student's understanding of factors and multiples to include common factors, common multiples, the greatest common factor, and the least common multiple. The student explores methods for finding prime numbers and the prime factorization of composite numbers. The student applies these ideas to solve problems.

### Special Requirements

The following materials are required for Lesson 1:

- pencil crayons
- calendar
- counters
- calculator

### Sharing Time

The student is asked to discuss what he or she is learning at the end of Activity 2 and Activity 4.

### Activity 2 Sharing Time

Practice and Homework Book, page 22, questions 1 to 14

1. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
2. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
3. 7, 14, 21, 28, 35, 42, 49, 56, 63, 70
4. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
5. 11, 22, 33, 44, 55, 66, 77, 88, 99, 110
6. 6, 12, 18, (24), 30, 36, 42, (48), 54, 60  
8, 16, (24), 32, 40, (48), 56, 64, 72, 80
7. (6), 12, 18
8. (28), 56, 84
9. (40), 80, 120
10. (30), 60, 90

11. 6

12. 10

13. 20

14. 12

### **Activity 4 Sharing Time**

Practice and Homework Book, page 24, questions 1 to 14

1. 1, 3, 7, 21
2. 1, 31
3. 1, 2, 4, 8, 16
4. 1, 5, 7, 35
5. 1, 41
6. 1, 3, 9, 27, 81
7. 1, 2, 3, 4, 6, 9, 12, 18, 36
8. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
9. 1, (2)
10. 1, 2, (4)
11. 1, 2, (4)
12. 1, (2)
13. 1, (7)
14. 1, 2, 3, (6)

### **Lesson 2: Representing Patterns**

#### **Overview**

In Lesson 2 the student represents and describes relationships seen in picture patterns and makes rules to extend patterns. The student discovers how patterns can be represented with graphs.

### Special Requirements

The following materials are required for Lesson 2:

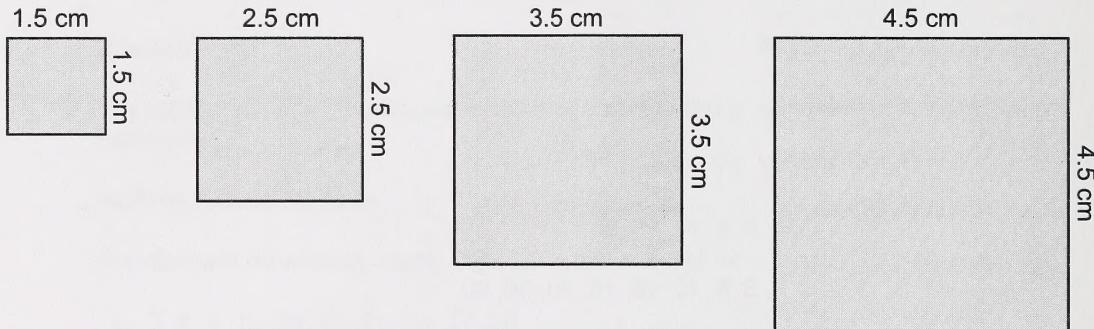
- calendar
- calculator
- small cubes
- pattern blocks

### Sharing Time

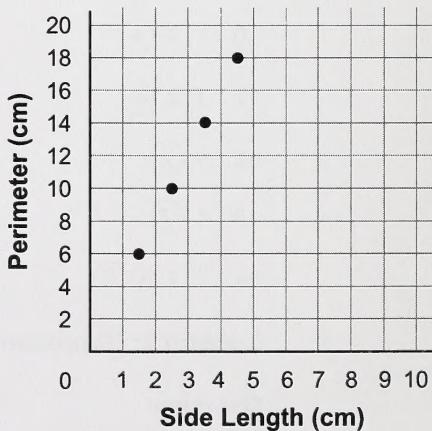
The students is asked to discuss what he or she is learning at the end of Activity 3.

### Activity 3 Sharing Time

Practice and Homework Book, page 4



Side Length (cm)	Perimeter (cm)	Ordered Pair
1.5	6	(1.5, 6)
2.5	10	(2.5, 10)
3.5	14	(3.5, 14)
4.5	18	(4.5, 18)



To find the perimeter, multiply the side length by 4.

## ASSIGNMENT BOOKLET 3A

PAT0610 Mathematics 6  
Module 3: Lesson 1 Assignment and Lesson 2 Assignment

### Home Instructor's Comments and Questions

### FOR SCHOOL USE ONLY

Assigned Teacher:

Date Assignment Received:

Grading:

Home Instructor's Signature

### FOR HOME INSTRUCTOR USE (if label is missing or incorrect)

Student File Number:

Date Submitted:

Apply Module Label Here

Name			
Address			
Postal Code			

*Please verify that preprinted label is for  
correct course and module.*

### Teacher's Comments

Teacher's Signature

**Home Instructor:** Keep this sheet when it is returned to you as a record of the student's progress.

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- Are all the assignments completed? If not, explain why.
- Has your work been reread to be sure the spelling and details are correct?
- Is the record form filled out and the correct module label attached?

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# Mathematics 6

## Module 3

Assignment Booklet 3A:  
Patterns



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## FOR TEACHER'S USE ONLY

### Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	30	
Lesson 2 Assignment	30	
	60	

### Teacher's Comments

Mathematics 6  
Module 3: Patterns  
Assignment Booklet 3A  
Learning Technologies Branch

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# ASSIGNMENT BOOKLET 3A

## MATHEMATICS 6—MODULE 3: PATTERNS

Your mark on this module will be determined by how well you do your assignments in the Assignment Booklets.

There are two lesson assignments in this Assignment Booklet. The total value of these assignments is 60 marks. The value of each assignment is stated in the left margin.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

Be sure to proofread each assignment carefully.

30

## Lesson 1 Assignment: Whole Number Patterns

**Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.**

1. The grocery store sells hot-dog buns in bags of 8 and wieners by the dozen. However, Carol says she can buy exactly the same number of wieners and buns to make hot dogs.
  - a. Explain how you can use a hundred chart and counters to show all the different numbers of buns and all the different numbers of wieners less than 100 that Carol can buy. Record your work on the hundred chart.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

② b. Explain how you can use the chart you completed in question 1.a. to find all the possible numbers of hot dogs less than 100 that Carol can make with no buns or wieners left over.

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② c. Complete the following chart. Use your answer from question 1.b. to complete the first row.

<b>Number of Hot Dogs</b>				
<b>Number of Packages of Buns</b>				
<b>Number of Packages of Wieners</b>				

① d. What is the least number of hot dogs Carol can make and have no buns or wieners left over?

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② e. What is the greatest number of hot dogs less than 300 that Carol can make and have no buns or wieners left over? Explain how you can use your calculator to find the answer.

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2. On a given number of days in July, Ramone ran the same whole number of kilometres each day for a total of 20 km. For the entire month of July, Simone ran the same whole number of kilometres each day for a total of 30 km.

Draw and label diagrams of arrays of counters to find the following distances.

(2)

a. all of the possible distances that Ramone could have run each day

(2)

b. all of the possible distances that Simone could have run each day

(3)

c. Is it possible that both Ramone and Simone went running for the same number of days? Answer the question and list all possibilities by completing the chart. (Hint: Use your work from questions 2.a. and 2.b. to complete the top row.)

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<b>Possible Number of Days That Both Joggers Could Have Run</b>				
<b>Number of Kilometres Ramone Ran on Each of Those Days</b>				
<b>Number of Kilometres Simone Ran on Each of Those Days</b>				

(1)

d. What is the greatest number of days that both joggers could have run in July if they both ran for the same number of days?

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(2)

e. A third jogger, Guillaume, ran on more than one day in July. He jogged the same number of kilometres each day for a total of 24 km. Could Guillaume, Ramone, and Simone all have run the same number of days in July? Explain.

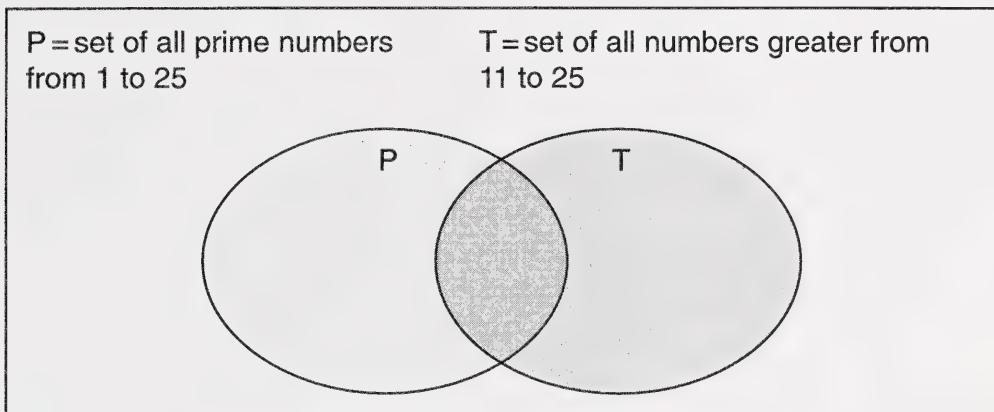
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② 3. a. Use the following Venn diagram to sort the numbers from 1 to 25.



② b. Describe the numbers that belong in both sets.

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② 4. Draw a factor tree for each of the following numbers, and then write the number as a product of prime factors.

a. 60

② b. 78

c. 56

②

30

**Lesson 2 Assignment: Representing Patterns**

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.



Turn to pages 32 and 33 in your textbook to Skill Bank from This Unit.

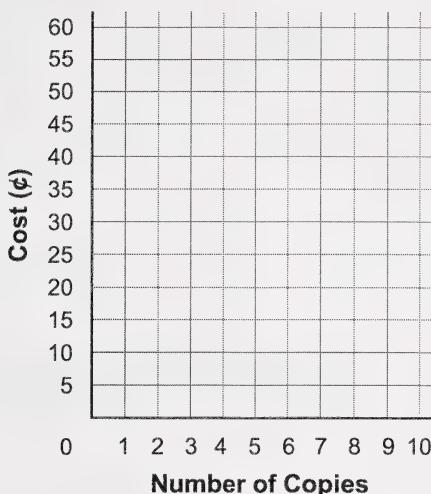
1. Use the table in question 1 on page 32 to complete the following questions.

a. Complete the table to show the cost for the first ten copies.

Number of Copies	Cost (¢)
1	15
2	20
3	25
4	30
5	35
6	40
7	
8	
9	
10	

(2)

b. Graph the cost for the first ten copies.



(2)

c. Write a rule that relates the number of copies to the cost.

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(6)

2. Do question 4 on page 32 of your textbook.

a.

b.

c.



3. Do question 6 on page 33 of your textbook.

a. \_\_\_\_\_

(2)

\_\_\_\_\_

b. \_\_\_\_\_

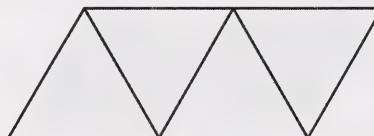


4. Turn to pages 20 and 21 in your textbook to Multiple Representations of Patterns. Do question 1 of Match Up by completing the following table.

(4)

Drawings	T-table	Graph	Rule
B			
F			
L			
N			

5. Gretta is embroidering a triangle pattern across the bottom hem of a curtain. Her pattern is shown.



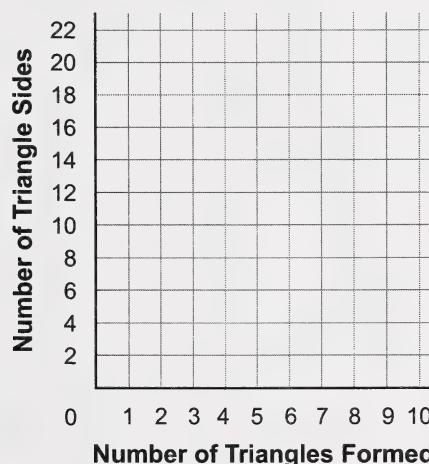
(2)

a. Use toothpicks to copy Gretta's pattern for the first four triangles and extend it to complete three more triangles. Draw a picture to show your work.

② b. Complete the following table for the first seven triangles.

Number of Triangles	Number of Triangle Sides
1	
2	
3	
4	
5	
6	
7	

② c. Complete the following graph for the first seven triangles.



② d. After the first triangle has been completed, how many more sides must be added to complete each new triangle?

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③ e. Gretta predicts that the number of triangle sides is always two times the number of triangles formed. Explain why you do or do not agree with Gretta.

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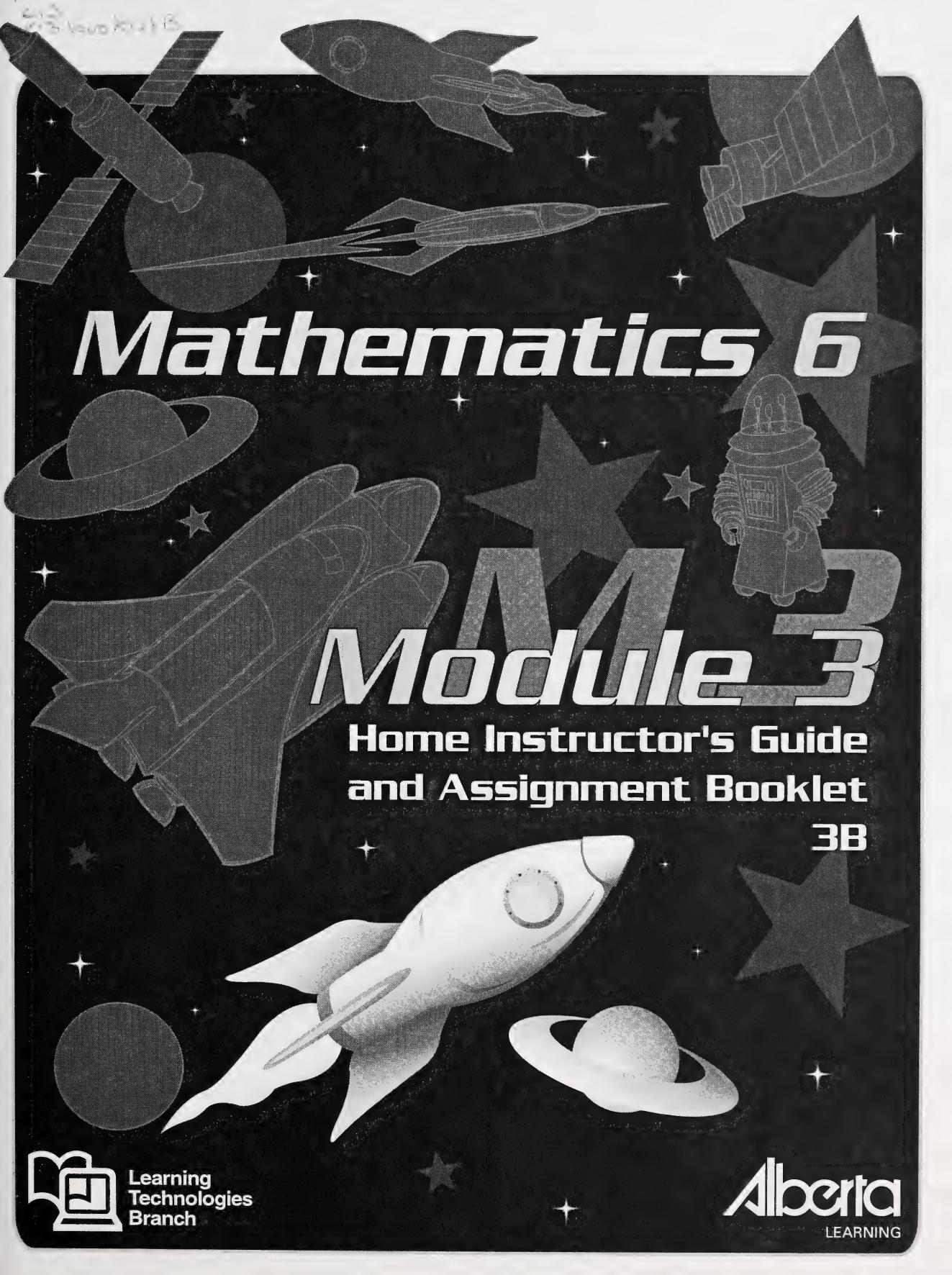
② f. Use your answer to question 1.e. to predict the number of sides that would have to be stitched for ten triangles. Explain.

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# Mathematics 6

## Module 3

Home Instructor's Guide  
and Assignment Booklet

3B



Learning  
Technologies  
Branch

Alberta  
LEARNING

Mathematics 6

Module 3: Patterns

Home Instructor's Guide and Assignment Booklet 3B

Learning Technologies Branch

ISBN 0-7741-2207-2

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## Lesson 3: Beginning Algebra

### Overview

In Lesson 3 the student explores algebraic expressions and discovers how algebraic expressions can be used to represent patterns using objects, pictures, and graphs. The student models problems with equations and then solves them by using blocks, pictures, and counting.

### Special Requirements

The following materials are required for Lesson 3:

- pattern blocks
- small tiles or blocks
- calculator

### Sharing Time

The student is asked to discuss what he or she is learning at the end of Activity 3. This Sharing Time exercise is open-ended, so answers will vary. However, some suggestions are given below.

### Activity 3 Sharing Time

Practice and Homework Book, page 40, questions 1 to 5

1. $c + 9 = 15$ $c = 15 - 9$ $c = 6$	2. $8 \times n = 32$ $n = 32 \div 8$ $n = 4$	3. $14 = 2 \times y$ $y = 14 \div 2$ $y = 7$
4. $36 \div b = 9$ $b = 36 \div 9$ $b = 4$	5. $14 = n - 6$ $n = 14 + 6$ $n = 20$	



## ASSIGNMENT BOOKLET 3B

PAT0610 Mathematics 6

Module 3: Lesson 3 Assignment and Numbers in the News Project

### Home Instructor's Comments and Questions

Home Instructor's Signature

### FOR HOME INSTRUCTOR USE (if label is missing or incorrect)

Student File Number:

Date Submitted:

Apply Module Label Here

Name

Address

Postal Code

*Please verify that preprinted label is for  
correct course and module.*

### FOR SCHOOL USE ONLY

Assigned Teacher:

Date Assignment Received:

Grading:

Additional Information:

### Teacher's Comments

Teacher's Signature

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# Mathematics 6

## Module 3

**Assignment Booklet 3B:  
Patterns**



Learning  
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**Alberta**  
LEARNING

## FOR TEACHER'S USE ONLY

### Summary

	Total Possible Marks	Your Mark
Lesson 3 Assignment	30	
Numbers in the News Project	10	
	40	

### Teacher's Comments

Mathematics 6  
Module 3: Patterns  
Assignment Booklet 3B  
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## ASSIGNMENT BOOKLET 3B

### MATHEMATICS 6—MODULE 3: PATTERNS

Your mark on this module will be determined by how well you do your assignments in the Assignment Booklets.

There is one lesson assignment and a Numbers in the News project in this Assignment Booklet. The total value of the lesson assignment is 30 marks. The Numbers in the News projects is worth 10 marks. The value of each question is stated in the left margin.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

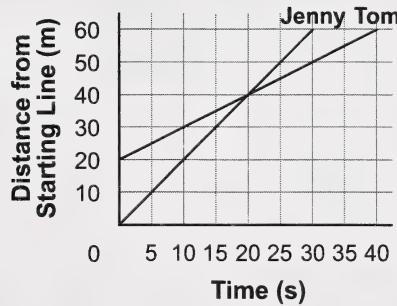
Be sure to proofread each assignment carefully.

30

#### Lesson 3 Assignment: Beginning Algebra

**Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.**

Jenny and her little brother, Tom, had a 60-m race. The following graph tells how far along the 60-m running track they were at different times during their race. Use the graph to answer questions 1 to 5.



①

1. a. Who won the race? By how many metres?

---

---

① b. Where along the running track did Jenny let her brother start the race?

---

---

① c. Who was leading after 15 s, and by about what distance?

---

---

① d. After the race began, how many seconds did it take Jenny to catch up to Tom?

---

---

① e. How far from the finish line were they when Jenny caught up to Tom?

---

---

② 2. Complete the following tables.

a.

Tom	
Time (s)	Distance (m)
5	
10	
15	
20	
25	
30	

b.

Jenny	
Time (s)	Distance (m)
	10
	20
	30
	40
	50
	60

3. Study the tables in question 2. Write a rule for each person that tells how you can find his or her distance from the starting line (in metres) by knowing the time (in seconds).

(1)

a. Jenny

---

---

(1)

b. Tom

---

---

4. Represent time (in seconds) with  $s$  and distance from starting line (in metres) with  $m$ . For each person, write an equation that represents the rule in question 3.

(1)

a. Jenny \_\_\_\_\_

(1)

b. Tom \_\_\_\_\_

(2)

5. If Jenny and Tom run the 60-m race again, and they both run the same speed as they did in the previous race, predict where Tom should start so that they cross the finish line together. Explain.

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6. Draw a picture that shows how you can use a balance scale and blocks to solve each of the following equations.

③ a.  $14 = 9 + g$

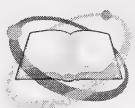
③ b.  $16 - j = 7$

7. Show how you can use a working-backwards strategy to solve each of the following equations.

② a.  $n \div 5 = 15$

② b.  $a \times 6 = 72$

② c.  $56 + t = 67$



8. Turn to page 87 in your textbook to On Your Own.

a. Do question 3 using a working-backwards strategy.

(3)

(2)

b. Check your answer by working forwards.

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## Numbers in the News

Go through the Scavenger Hunt list for Module 3 to make sure you have clipped at least one example for each question. Ask your home instructor to check the samples you found. Choose the sample you wish to use, and label each one with the scavenger hunt item it matches. Organize your samples and put them together with any other information required. Submit your project with this Assignment Booklet.

Ask yourself the following questions:

- Is my Numbers in the News project complete? (Have I included all my samples?)
- Do my samples show the ideas clearly? (Are my examples appropriate?)
- Did I take care to be neat when organizing and labelling my work?





